Direct democracy, coalition size and public spending

Emmenegger, Patrick ; Leemann, Lucas ; Walter, André

Abstract: This article contributes to the literature on direct democracy and public spending in two ways. First, we explore how direct democratic institutions interact with a specific aspect of the representative system, the size of the governing coalition, to influence public spending. Second, based on newly collected data, we examine the relationship between three different direct democratic institutions, coalition size and public spending over the period from 1860 to 2015. Empirically, we find that initiatives increase the size of the public sector under single-party governments, but this positive relationship disappears as coalition size increases. In contrast, we find that financial referendums slow down the growth of public spending, while law referendums are not systematically associated with public spending. Finally, we find that the relationship between direct democratic institutions, coalition size and public spending does not change over time despite the long period under investigation.

DOI: https://doi.org/10.1017/s0143814x20000306

6 Appendix

6.1 Summary Statistics of the Data

Table 3: Summary Statistics

Variable	vars	n	mean	sd	min	max	range	se
Δ ln public spending (p.c.)	1	724	0.1	0.3	-1.9	3.3	5.2	0.0
Year	2	741	1926.4	54.8	1830.0	2015.0	185.0	2.0
Number of parties	3	671	2.7	1.0	1.0	5.0	4.0	0.0
Lagged logarithm of spending (p.c.)	4	724	6.8	1.6	2.8	10.0	7.2	0.1
Initiative	5	741	2.9	1.9	0.0	6.0	6.0	0.1
Law referendum	6	741	3.2	2.3	0.0	6.0	6.0	0.1
Financial referendum	7	741	0.1	0.1	0.0	1.3	1.3	0.0
Share second sector (employees)	8	638	0.4	0.1	0.1	0.7	0.6	0.0
Share first sector (employees)	9	638	0.2	0.2	0.0	0.8	0.8	0.0
Dependency ratio (younger than 20, older than 64)	10	638	0.4	0.0	0.3	0.5	0.2	0.0
Child mortality	11	709	0.1	0.1	0.0	0.4	0.4	0.0
Share of left parties	12	671	0.1	0.2	0.0	0.6	0.6	0.0
Proportional representation	13	741	0.5	0.5	0.0	1.0	1.0	0.0
Population density	14	666	0.9	0.6	0.2	4.2	4.1	0.0
Logarithm population density	15	741	5.0	0.9	2.9	7.3	4.4	0.0
Logarithm of federal subsidies	16	741	9.2	4.0	0.0	15.6	15.6	0.1

6.2 Measuring Direct Democracy

We rely on indicator from Leemann (2019) who in turn builds on Stutzer (1999). The subnational direct democracy index (snDDI) is a composite measure and we use here three disaggregated elements from it.

6.2.1 Initiative

The initiative is coded on the number of days one is granted to collect the necessary amount of signatures as well as the amount of signatures. Table 4 shows how these measures are translated into index points:

Table 4: Index Rules for Initiative

Absolute Numbers of Signatures	Points	Relative Share of Signatures	Points	Allowed Collection Period	Points
0-2,500	6	0-1%	6	more than 300 days	6
2,500-5,000	5	1-2%	5	241-300 days	5
5,000-7,500	4	2-3%	4	181-240 days	4
7,500-10,000	3	3-4%	3	121-180 days	3
10,000-12,500	2	4-5%	2	61-120 days	2
more than 12,500	1	more than 5%	1	less than 60 days	1

The score for the initiative is then the average value across these three dimensions.

6.2.2 Law Referendum

The structure of the law referendum is very similar to the initiative (see Table 5). The largest difference to the initiative lies in how the absolute signatures are counted - lower numbers count for more in the law referendum.

Table 5: Index Rules for Law Referendum

Absolute Numbers of Signatures	Points	Relative Share of Signatures	Points	Allowed Collection Period	Points
0-1,250	6	0-1%	6	more than 150 days	6
1,250-2,500	5	1-2%	5	121-150 days	5
2.500-3,750	4	2-3%	4	91-120 days	4
3,750-5,000	3	3-4%	3	61-90 days	3
5,000-6,250	2	4-5%	2	31-60 days	2
more than 6,250	1	more than 5%	1	less than 30 days	1

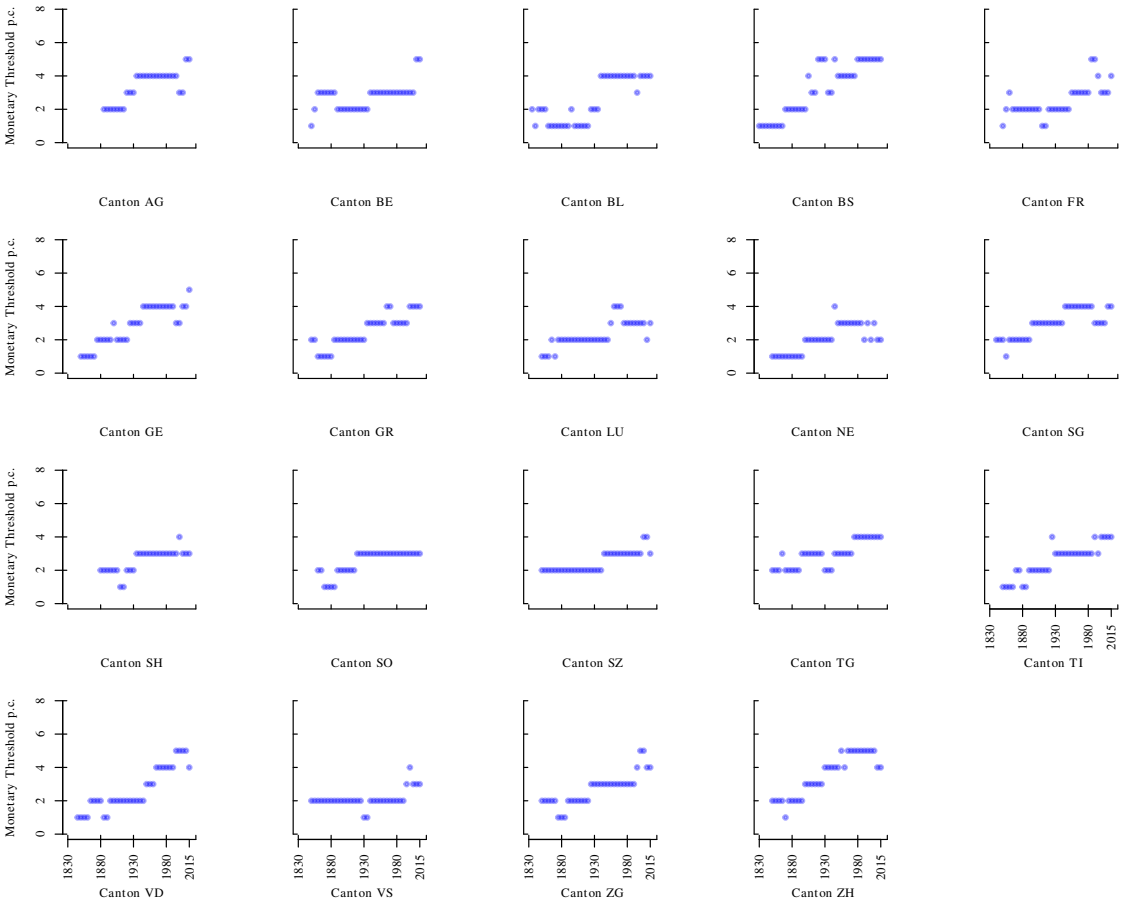
The score for the initiative is then the average value across these three dimensions.

6.2.3 Financial Referendum

For the financial referendum we rely on two measures. The first one accounts for whether such an institution was present in a given canton year observation. The second measure is the defined threshold that triggers a vote. We take the threshold and adjust it for inflation to create a measure that is comparable over time.

6.3 Number of Parties in Government

Figure 9: Number of Parties in Government over Time, 1830-2015



6.4 Robustness Tests

Table 6: Results with Citizen Assembly Cantons, 1860-2015

	Model 1	Model 2	Model 3	Model 4
Proportional Representation	−0.06	−0.05	−0.05	−0.06
	(0.04)	(0.04)	(0.04)	(0.04)
Popular Initiatives	0.04**	0.01	0.01	0.04**
	(0.01)	(0.01)	(0.01)	(0.01)
Financial Ref. (Threshold)	0.10	0.10	0.20	0.16
	(0.07)	(0.07)	(0.15)	(0.16)
With Financial Referendum	−0.01	−0.00	−0.00	−0.01
	(0.04)	(0.04)	(0.04)	(0.04)
Law Referendum	0.01	0.02	0.01	0.01
	(0.01)	(0.02)	(0.01)	(0.02)
Lag Dep. Variable	−0.47***	−0.47***	−0.47***	−0.47***
	(0.05)	(0.05)	(0.05)	(0.05)
Share First Sector	−0.46	−0.55	−0.55	−0.46
	(0.44)	(0.47)	(0.47)	(0.45)
Share Second Sector	−0.08	−0.05	−0.06	−0.08
	(0.37)	(0.37)	(0.37)	(0.38)
Dependency Ratio	0.69	0.63	0.61	0.68
	(0.61)	(0.61)	(0.61)	(0.60)
Infant Mortality	−0.47	−0.45	−0.47	−0.48
	(0.39)	(0.39)	(0.40)	(0.39)
Share Left Parties	0.05	0.03	0.03	0.05
	(0.07)	(0.07)	(0.07)	(0.07)
Physician Density	0.06	0.06	0.05	0.06
	(0.08)	(0.08)	(0.08)	(0.08)
ln Population Size	0.05	0.04	0.03	0.05
	(0.13)	(0.14)	(0.14)	(0.13)
ln Federal Subsidies	0.02*	0.02*	0.02*	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Num. Par. * Initiative	−0.02**			−0.02**
	(0.01)			(0.01)
Num. Par. * Law Referendum		−0.00		0.00
		(0.01)		(0.01)
Num. Par. * Fin. Referendum			−0.04	−0.02
			(0.05)	(0.06)
R^2	0.56	0.55	0.55	0.56
Adj. R^2	0.50	0.49	0.49	0.50
Num. obs.	774	774	774	774
RMSE	0.16	0.16	0.16	0.16

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 7: Direct Democracy and Government Spending without City Cantons

	Model 1	Model 2	Model 3	Model 4
Number of Parties	0.10***	0.05*	0.05*	0.09**
	(0.03)	(0.02)	(0.02)	(0.03)
Popular Initiatives	0.05**	0.02	0.02	0.06**
	(0.02)	(0.01)	(0.01)	(0.02)
Financial Ref. (Threshold)	0.16*	0.18*	0.40*	0.35·
	(0.07)	(0.08)	(0.18)	(0.19)
With Financial Referendum	−0.01	0.01	0.01	−0.01
	(0.03)	(0.04)	(0.04)	(0.03)
Law Referendum	0.00	0.01	0.00	−0.00
	(0.01)	(0.02)	(0.01)	(0.02)
Lag Dep. Variable	−0.30***	−0.30***	−0.30***	−0.30***
	(0.05)	(0.04)	(0.04)	(0.05)
Share First Sector	−0.31	−0.28	−0.28	−0.31
	(0.29)	(0.29)	(0.29)	(0.30)
Share Second Sector	−0.29	−0.18	−0.14	−0.27
	(0.38)	(0.37)	(0.38)	(0.38)
Dependency Ratio	0.88	0.81	0.84	0.93
	(0.60)	(0.66)	(0.64)	(0.60)
Infant Mortality	−0.03	−0.01	−0.02	−0.06
	(0.56)	(0.56)	(0.55)	(0.57)
Share Left Parties	−0.07	−0.12	−0.11	−0.06
	(0.09)	(0.09)	(0.10)	(0.09)
Proportional Representation	−0.07*	−0.07*	−0.07*	−0.07*
	(0.03)	(0.03)	(0.03)	(0.03)
Physician Density	−0.11·	−0.11·	−0.11·	−0.11·
	(0.06)	(0.06)	(0.06)	(0.06)
ln Population Size	0.15*	0.10·	0.09	0.14*
	(0.06)	(0.06)	(0.06)	(0.06)
ln Federal Subsidies	0.04***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Num. Par. * Initiative	−0.02***			−0.02**
	(0.00)			(0.01)
Num. Par. * Law Referendum		−0.00		0.00
		(0.00)		(0.00)
Num. Par. * Fin. Referendum			−0.09	−0.08
			(0.07)	(0.07)
R^2	0.53	0.52	0.52	0.53
Adj. R^2	0.46	0.45	0.45	0.46
Num. obs.	564	564	564	564
RMSE	0.16	0.16	0.16	0.16

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Table 8: Direct Democracy and Government Spending without Neuchatel after 1970

	Model 1	Model 2	Model 3	Model 4
Number of Parties	0.08**	0.04	0.05*	0.07**
	(0.02)	(0.02)	(0.02)	(0.03)
Popular Initiatives	0.04*	0.02	0.02	0.05*
	(0.02)	(0.01)	(0.01)	(0.02)
Financial Ref. (Threshold)	0.22*	0.23*	0.30	0.29
	(0.11)	(0.11)	(0.21)	(0.24)
With Financial Referendum	−0.03	−0.02	−0.03	−0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Law Referendum	0.01	0.00	0.01	−0.01
	(0.01)	(0.02)	(0.01)	(0.02)
Lag Dep. Variable	−0.30***	−0.30***	−0.30***	−0.30***
	(0.05)	(0.04)	(0.04)	(0.05)
Share First Sector	−0.37	−0.36	−0.36	−0.37
	(0.25)	(0.25)	(0.24)	(0.25)
Share Second Sector	−0.20	−0.15	−0.13	−0.22
	(0.30)	(0.31)	(0.30)	(0.31)
Dependency Ratio	0.95*	0.98·	0.96·	1.02*
	(0.48)	(0.51)	(0.50)	(0.46)
Infant Mortality	−0.26	−0.26	−0.26	−0.28
	(0.53)	(0.52)	(0.52)	(0.55)
Share Left Parties	−0.09	−0.11	−0.11	−0.08
	(0.08)	(0.08)	(0.08)	(0.08)
Proportional Representation	−0.08**	−0.07**	−0.07**	−0.08**
	(0.03)	(0.03)	(0.03)	(0.03)
Physician Density	−0.10*	−0.10*	−0.10*	−0.10*
	(0.04)	(0.04)	(0.04)	(0.04)
ln Population Size	0.04	0.03	0.04	0.04
	(0.06)	(0.05)	(0.05)	(0.06)
ln Federal Subsidies	0.03*	0.03*	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)
Num. Par. * Initiative	−0.01*			−0.01**
	(0.00)			(0.00)
Num. Par. * Law Referendum		0.00		0.01
		(0.01)		(0.01)
Num. Par. * Fin. Referendum			−0.03	−0.03
			(0.08)	(0.08)
R^2	0.52	0.52	0.52	0.52
Adj. R^2	0.46	0.46	0.46	0.46
Num. obs.	619	619	619	619
RMSE	0.15	0.15	0.15	0.15

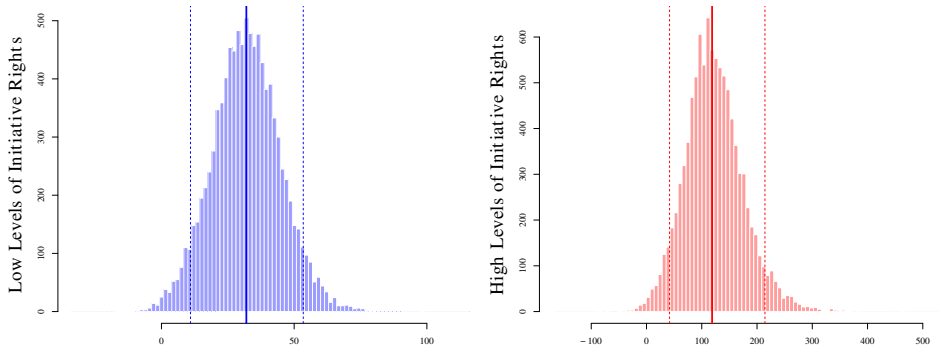
$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

6.5 Long-Run vs Short-Run Effects

Error correction models have a dynamic component. Yet, the shown estimates as well as the visualizations of the interaction effects display only short-run effects. In the following, we turn to the long-run total marginal effects based on the dynamic structure of the model. Following De Boef and Keele (2008), we compute the long-run total marginal effects as $e^{(\frac{\beta}{-\gamma})} - 1$, where β is the estimated coefficient of a variable X and γ is the coefficient of the lagged outcome variable. The effect is the percent change. We draw 1,000 simulations of a pseudo-posterior vector (assuming perfectly multivariate normally distributed coefficients) and use these simulations to compute the long-run effects. We compare two hypothetical cantons where one has a two-party coalition government and the other has a four-party coalition government.

How does the number of parties matter? We first look at long-run total marginal effects of popular initiatives. We do so for a hypothetical canton with low values on the popular initiative index and for a hypothetical canton with a high value. We take the range of values in the year 1930, i.e. the lowest value is 1.5 and the highest is 5. At low to moderate levels of initiative rights (index value of 1.5), we find that the long-term difference is about 32% more public spending in the two-party case. This is illustrated in the left panel of Figure 10. At high levels of initiative rights (index value of 5), the long-term difference is even more impressive (see the right panel of Figure 10). The difference between a canton with two parties in government and one with four parties in government is 118.7% in the long run. Substantively, these simulations of long-run total marginal effects show that in the long run, a canton with a large governing coalition will spend about twice as much as one with a small coalition when there are extensive initiative rights.

Figure 10: Long-Run Total Marginal Effects: Popular Initiatives



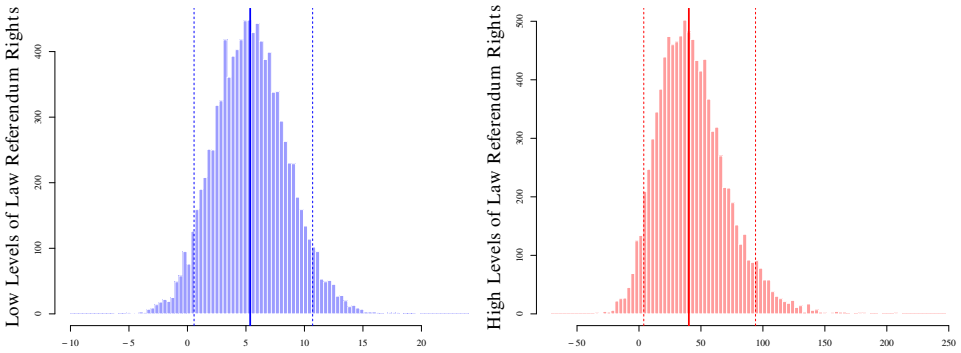
Note: Blue histogram is for low levels of initiative rights. Red histogram is for fairly developed initiative rights. Dashed lines indicate the 95% confidence interval.

We now turn to law referendums. The impact of law referendums depends on the size of the government. We look again at how a difference in the number of parties in government affects long-term spending. We do so for a hypothetical canton with low values on the law referendum index and for a hypothetical canton with a high value. As

above, we take the range of values in the year 1930, i.e. the lowest value is 1 and the highest is 5.

Figure 11 shows the difference between a two-party government and a four-party government. In the long run, a large government will spend approximately 5.4% more. But this difference is much larger if there are extensive law referendum rights available. With extensive referendum rights the long-term difference is about 40.2%. Substantively, these simulations of long-run total marginal effects show that in the long run, a canton with a large governing coalition will spend almost one and half times as much as one with a small coalition when there are extensive law referendum rights.

Figure 11: Long-Run Total Marginal Effects: Law Referendums

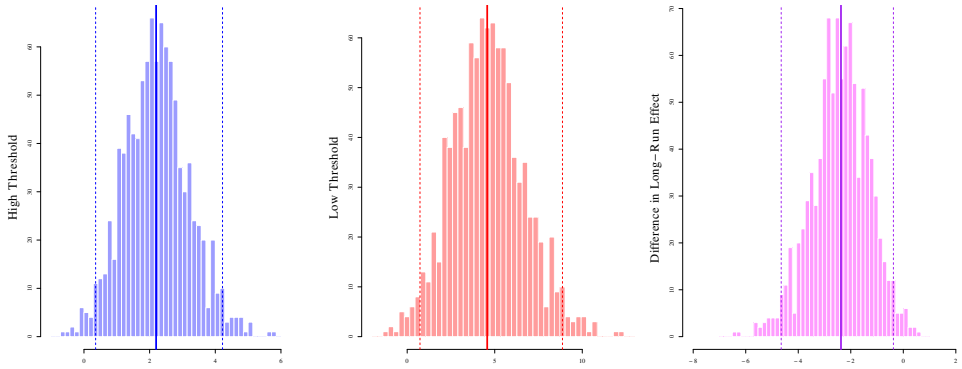


Note: Blue histogram is for low levels of referendum rights. Red histogram is for fairly developed referendum rights. Dashed lines indicate the 95% confidence interval.

The last institution is the financial referendum. It is measured as the threshold of public spending (p.c. and adjusted for inflation) that triggers a ballot vote on that spending. As Table 1 shows, the effect of the financial referendum does not depend on coalition size. We therefore resort to a simpler illustration of its long-term effect. To show the long-run impact in Figure 12, we simulate the effect it has when it moves from a high (0.09) to a lower value (0.04). These two values correspond to the first and third quartile of the threshold value in 1930.

Figure 12 shows that the difference in the long-run impact from slightly decreasing the threshold for the financial referendum is -2.4% in public spending. Substantively, these simulations of long-run total marginal effects show that in the long run, cantons with high monetary thresholds for financial referendums will spend between 2-3% more than cantons with low thresholds.

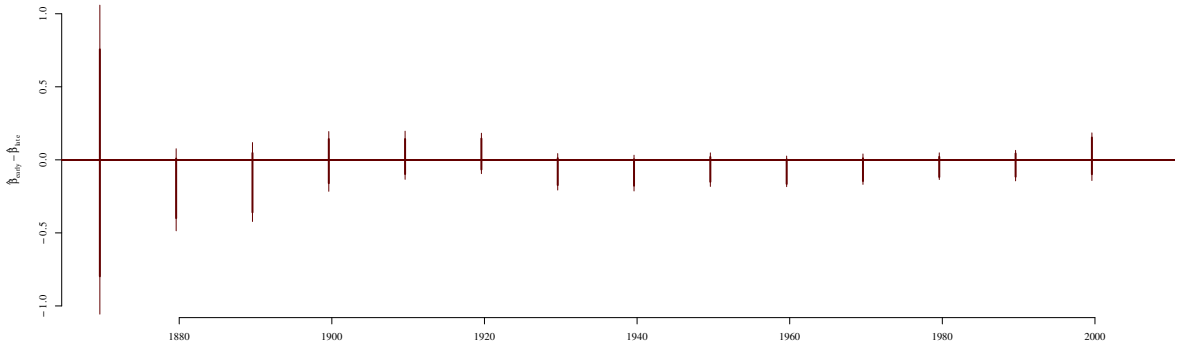
Figure 12: Long-Run Total Marginal Effects: Financial Referendums



Note: Blue and red histogram is for lower/higher threshold. The purple histogram shows the difference. Dashed lines indicate the 95% confidence interval.

6.6 Overtime Stability: Initiative without WWII Years

Figure 13: Overtime Stability: Initiative without WWII Years



Note: For each test we take 1,000 draws from the posterior vector and then compare the two draws. The figure shows the 95% and the 99% confidence interval of the difference of the two coefficients (early vs late fold).